J. W. Stow,

Carburetor.

No. 113702. Patented Apr. 11. 1871.

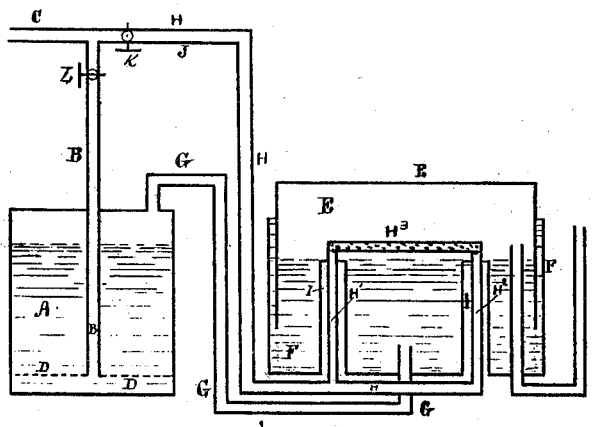


Fig. 1

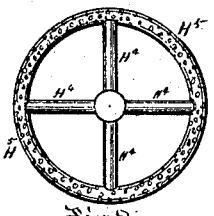


Fig. 2

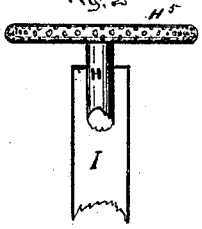


Fig. 3

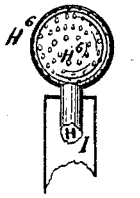


Fig. 4

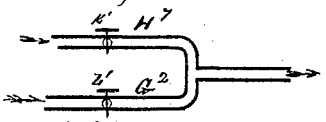


Fig 6

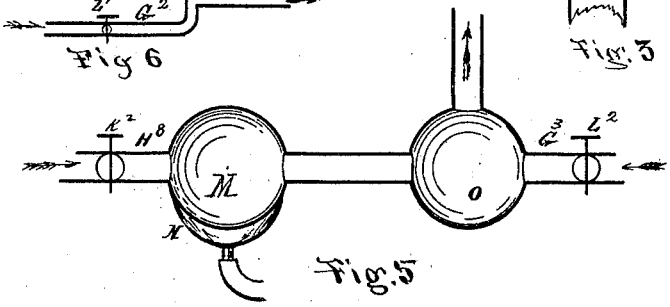


Fig. 5

Witnesses

W. H. Dimmick

Wm. B. Isaacs

Inventor

J. W. Stow

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# United States Patent Office.

JOSEPH W. STOW, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 113,702, dated April 11, 1871.

## IMPROVEMENT IN THE MANUFACTURE OF PNEUMATIC GAS FOR ILLUMINATING, &c.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, JOSEPH W. STOW, of San Francisco, in the county of San Francisco and in the State of California, have invented an Improvement in the Manufacture of Pneumatic Gas, of which the following is a specification, reference being had to the accompanying drawing.

In the manufacture of illuminating-gas from gasoline or similar hydrocarbons great difficulty has been experienced in obtaining gas of a uniform quality in consequence of, first, the difference in the specific gravity of the gasoline, as the rapidity with which it (gasoline) vaporizes at a given temperature depends very much upon its density; and, second, even though a gasoline of uniform standard be employed, and the carbureter be maintained at an unchanged temperature, it is always found that the more volatile portions are given off first, making a very rich gas; but, as the process of carbureting goes on, the evaporation becomes less free, so that, as the bulk of gasoline is reduced, the gas gradually becomes poorer.

The method usually adopted to attain a uniformity in the quality has been to control the vaporization of the gasoline by regulating the temperature of either the gasoline itself or of the air which was being passed through it. Another method has been to add atmospheric air to the gas after it has been produced in such quantities as should reduce it (the gas) to the desired photometric standard. But these means, as they have been heretofore employed, have failed to accomplish the desired end.

It has been found entirely impracticable to regulate the temperature satisfactorily, and the manner in which air has been introduced is objectionable for two reasons:

First, it permitted condensation to take place in the pipes, which is very objectionable; and

Secondly, it failed to produce a uniform quality of gas at all points, this latter defect arising from the imperfect diffusion or mixing of the air with the gas.

The invention relates to that class of machines or works in which air is forced through or over the gasoline at such a temperature as shall insure a gas richer in carbon than is required for illuminating purposes, and is designed to overcome the above-recited difficulties, and to accomplish the manufacture of a gas which shall not be subject to condensation under such changes of temperature as it shall ordinarily be subjected to, and shall be of uniform density and photometric quality; to this end

The invention consists in introducing or adding to and combining with the carbureted air such portion of atmospheric air as may be desired, and intimately mixing or diffusing the same throughout the gas by means of certain devices, as will be hereinafter fully explained.

Figure 1 is a longitudinal vertical section of a pneumatic gas apparatus embodying my invention.

Figures 2, 3, 4, 5, and 6 represent various devices by the aid of which my invention may be carried into effect.

Each part is distinguished by the same letter whenever it appears in the drawing.

A is a tank closed at top and bottom.

Through the center of the tank A passes a vertical tube, B, communicating at its upper end with the pipe C, and at its lower end with the space at the under side of the perforated false bottom D.

The tanks E and F represent an ordinary gas-holder.

The tank A communicates with the interior of the gas-holder by means of the pipe G.

If the gas-holder be supplied with water and the tank A with some suitable liquid hydrocarbon, and atmospheric air be forced down through the tube B, under the perforated plate, up through the liquid hydrocarbon, and, through the pipe G, to the interior of the gas-holder, the ordinary mixture of air and vapor, known and used as pneumatic gas, will collect above the surface of the water in the interior of the tank E. The constantly varying proportions of the ingredients and lack of permanency of this mixture have been hereinbefore set forth, as well as the inconvenience and waste attending its use if too highly charged with vapor.

When my invention is employed the mixture may be supplied from the tank A, with as large a proportion of vapor as possible, and an additional quantity of air is regularly supplied to and incorporated with it in the tank E, just sufficient in quantity to secure and constantly maintain the proper uniform proportions of the ingredients, in order that no condensation may take place in the distributing-pipes, no waste of carbon occur, and the most economical production of light or heat is obtained, constant in quantity and quality for a given bulk. This additional supply of air is introduced from the pipe C through the pipe H.

The pipe H is divided into two branches $H^1$ $H^2$, terminating in a perforated horizontal pipe, $H^3$, by which the air entering through the pipe H is discharged in every direction, and becomes intimately incorporated with the mixture.

When hot air is to be admitted through the pipe H the branches $H^1$ $H^2$ should be protected from contact with the water. The sleeves or outer pipes I are provided for that purpose.

Instead of the branches $H^1$ and $H^2$ and the straight pipe $H^3$, the pipe H may terminate in the center of the gas-holder and in arms $H^4$, and discharge the air through the perforations of the endless pipe $H^5$, figs. 2 and 3, or may terminate in the rose $H^6$, fig. 4.

Heat may be applied to the pipe H at J, or the

pipe H may be divided and connected with each end of a coil of pipe passing through a furnace; or the air passing through the pipe H may be heated in any convenient manner.

Although the addition and incorporation of cold air will accomplish, to a certain extent, the various objects of my invention, the addition and incorporation of hot air, in the manner herein described, will produce pneumatic gas that at any given temperature will retain a much larger proportion of carbon than would be retained at that temperature by any pneumatic gas produced by the ordinary process or system without my invention, or by any pneumatic gas produced by my improved process without heating the air.

The pipe C may receive its supply of air from a fan driven by a steam-engine, or from any suitable blowing-machine driven in any convenient manner.

Both the pipe H and the pipe B may receive their supply of air from the pipe C, as shown in the drawing, or from different sources.

The quantity of air admitted to the respective pipes can be regulated by the stop-cocks K and L.

I am aware that atmospheric air has been added to gas made from gasoline and other hydrocarbons; but the operation as heretofore conducted has not resulted satisfactorily, because the addition has been made during the passage of the gas through the mains or service-pipes, and the proportions could not be properly regulated, nor could a thorough diffusion be effected, for which reason an inferior quality of gas was produced, and more or less condensation would take place in the pipes; but I have found, by repeated and thorough trials, that, by mixing the air with the gas in a large gasometer, into which the air is introduced through a rose or perforated coil of pipe, and in which a thorough and intimate diffusion and assimilation takes place, I am enabled to manufacture a gas of uniform density, and which is not subject to condensation under any pressure or change of temperature to which it is ever subjected in ordinary practice.

I have found that, by effecting this diffusion and assimilation by means of these devices, whereby the mixing can take place while the gas is in a state of comparative rest, and when the required length of time can be allowed, I can largely increase the quantity of gas produced from a given amount of gasoline, as I can add from two hundred to four hundred per cent. of atmospheric air to the carbureted air without reducing the standard of its photometric value.

I am also aware that attempts have been made to improve ordinary coal-gas by combining with it carbureted air; therefore I do not claim, broadly, either the combination of two or more illuminating-gases, nor the addition of atmospheric air to air which has been previously carbureted; but

What I do claim is—

The herein-described method of combining atmospheric air and carbureted air by means of the devices described.

In testimony whereof I have hereunto set my hand this 25th day of October, A. D. 1870.

J. W. STOW.

Witnesses:

W. H. DIMOND,

WM. B. ISAACS.